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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/588,478	06/07/2000	Yasuhiro Morii	50073-030	8907

20277 7590 10/05/2004

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WASHINGTON, DC 20005-3096

EXAMINER	
RUDE, TIMOTHY L	

ART UNIT	PAPER NUMBER
2883	

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/588,478	MORII, YASUHIRO	
	Examiner	Art Unit	
	Timothy L Rude	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) *1-14* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15 and 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims

1. Claims 15 and 16 are amended.

Claim Objections

2. Objections to claims 15 and 16 are withdrawn.

Drawings

3. Objections to Figures 8(a)-10(b) are withdrawn.

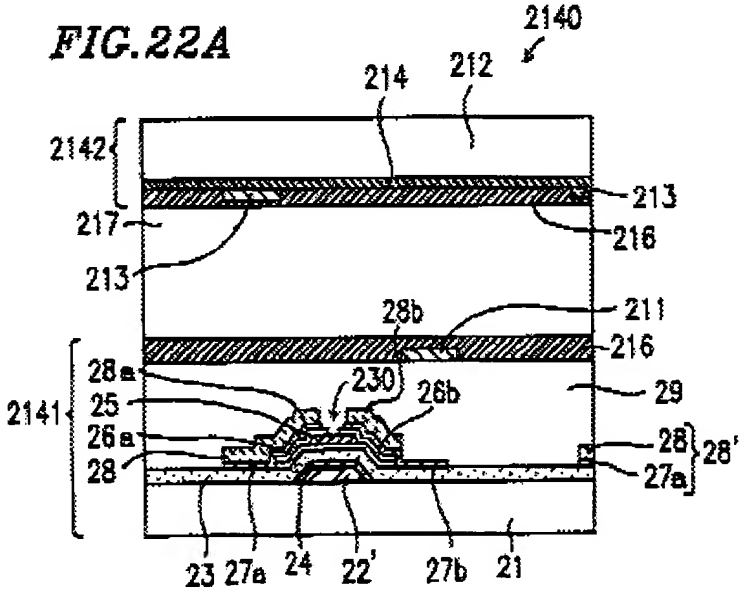
Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al (Shimada) USPAT 5,852,485 in view of Yih USPAT 3,866,313, Suzuki USPAT 6,509,948 B2, Utsumi et al (Utsumi) USPAT 6,441,880 B1, and Shigeta et al (Shigeta) USPAT 6,266,121 B1.

As to claims 15 and 16, the structural limitations in these process claims only have patentable weight when they have a non-obvious impact on the process steps, which in general, can be used to make any of a large number of LCD devices with alternate structures. Shimada discloses in Figures 21, 22A, and 22B, the process of fabricating a liquid-crystal display (LCD) device (in-plane switching-type or conventional type) which comprises; the fabrication of LCD substrate assemblies prior to filling with liquid crystal (Example 12, col. 31, line 66 through col. 36, line 6), comprising: a step of forming a first, substrate, 21, having plural electrodes that include a source line (Applicant's scanning signal line), 28', a Gate line (Applicant's image signal line), 22, a pixel electrode, 211, and an alignment layer, 216, all formed thereon, and a second substrate, 212, having a color filter, 214, a counter electrode also serving as a black matrix (Applicant's light-shielding film), 213, and an alignment layer, 216 all formed thereon.



Shimada does not explicitly disclose forming a sealant between the two substrates and around the outer peripheries of the substrates in such a manner that it partly reaches the edges of the substrates to form an opening through which liquid crystal is to be injected into the space between the sealed substrates, and a step of setting the panel in a liquid crystal-injecting unit having therein a container filled with liquid crystal, evacuating both the liquid crystal-injecting unit and the panel, putting the opening of the panel into the liquid crystal in the container, thereafter restoring the liquid crystal-injecting unit to have an atmospheric pressure in that condition so that the liquid crystal is injected into the panel through its opening owing to the inner pressure difference between the unit and the panel, and finally sealing the opening of the panel in such a condition that the panel receives no external pressure.

Yih teaches in Figures 1-6 the steps of adhesive application, evacuation, filling, sealing, etc. (Figures 1-5b, and col. 2, line 41 through col. 4 line 52) comprising forming a sealant between the two substrates (col. 3, lines 20-35) and around the outer peripheries of the substrates in such a manner that it partly reaches the edges of the substrates to form an opening (col. 3, lines 23-28) through which liquid crystal is to be injected into the space between the sealed substrates, and a step of setting the panel in a liquid crystal-injecting unit (col. 4, lines 10-17) having therein a container filled with liquid crystal, evacuating both the liquid crystal-injecting unit and the panel, putting the opening of the panel into the liquid crystal in the container (col. 5, lines 26-31), thereafter restoring the liquid crystal-injecting unit to have an atmospheric pressure (col. 4, lines 13-19 and col. 5, line 32 through col. 6, line 5) in that condition so that the liquid

crystal is injected into the panel through its opening owing to the inner pressure difference between the unit and the panel (col. 4, lines 15-17), and finally sealing the opening of the panel in such a condition that the panel receives no external pressure (col. 4, line 19) to complete LCD assembly without bubble formation.

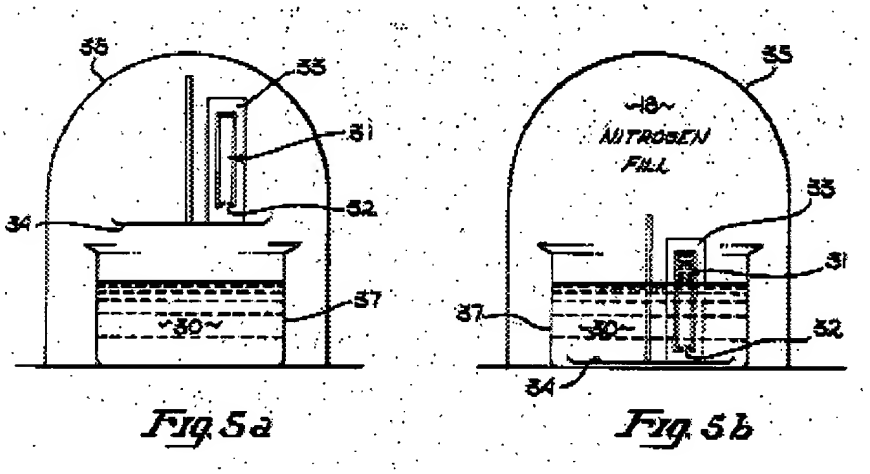


Fig. 5a Fig. 5b

Yih teaches forcing the liquid crystal into the LCD assembly by replacing the partial vacuum with a non-reacting gas (therefore at atmospheric pressure) (col. 6, lines 1-3). Yih teaches sealing after removal from the vacuum which would result in the panel receiving no external pressure (col. 4, lines 18 and 19), and Yih teaches sealing *after* removal of the LCD device from the liquid crystal material after filling (col. 6, lines 14-21), and that could not be accomplished without introducing a bubble (avoided by the process of Yih) if the inner pressure were any lower than atmospheric pressure, especially by as much as 0.3 kgf/cm^2.

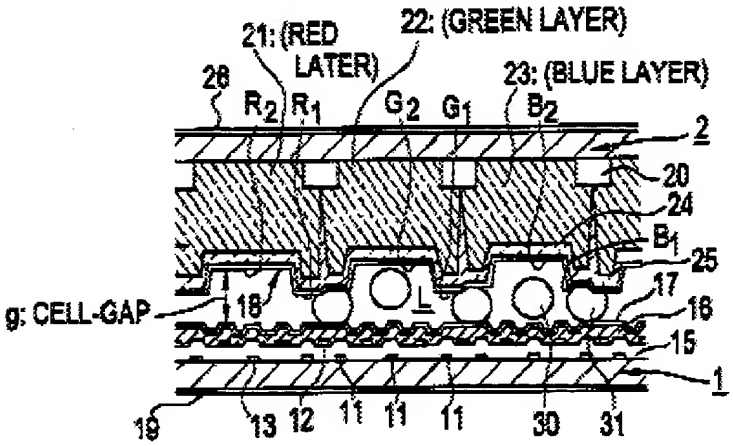
Yih is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use the adhesive application and fill techniques of Yih to complete LCD assembly with an internal pressure that is substantially equal to atmospheric pressure (within 0.3 Kgf/cm^2) to avoid bubble formation.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD fabrication process of Shimada with the sealing and filling process steps of Yih to avoid bubble formation.

Shimada does not explicitly disclose defining a gap between the first and second substrate by disposing a spacer, which is smaller than said gap, on a projecting pattern.

Suzuki teaches in Figures 2A and 2B defining a gap between the first and second substrate by disposing a spacer, 31, which is smaller than said gap, on a projecting pattern at a position corresponding to the shading membrane, 20, on one face of the second substrate where spacers, 30, remain uncompressed so the liquid crystal molecules will not be subject to anomalous orientation and light leakage will be avoided (Abstract).

FIG. 2B



Suzuki is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to define a gap between the first and second

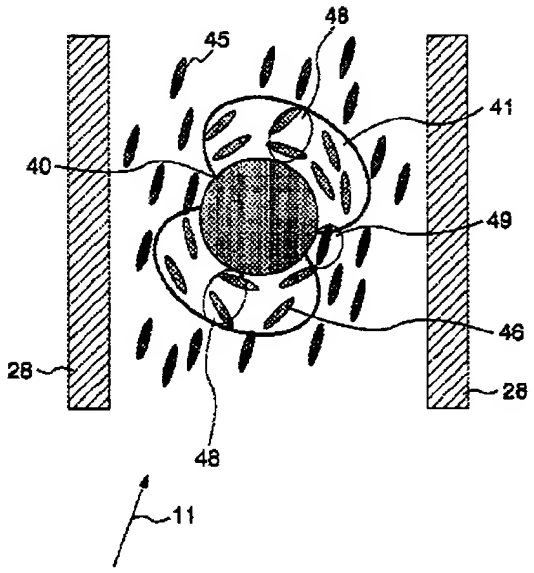
substrate by disposing a spacer which is smaller than said gap, on a projecting pattern where spacers in the pixel regions remain uncompressed so the liquid crystal molecules will not be subject to anomalous orientation and light leakage will be avoided.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Shimada by defining a gap between the first and second substrate by disposing a spacer which is smaller than said gap, on a projecting pattern of Suzuki where spacers in the pixel regions remain uncompressed so the liquid crystal molecules will not be subject to anomalous orientation and light leakage will be avoided.

Shimada does not explicitly disclose a long-chain alkyl group (functional group) on the surface of the spacers.

Utsumi teaches in Figures 1, 2, and 9, the use of long-chain alkyl group coated spacers (col. 10, lines 8-11) to improve contrast and viewing angle (col. 5, lines 36-40, col. 9 and Abstract).

FIG.2



Utsumi is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add the use of long-chain alkyl group coated spacers to improve contrast and viewing angle.

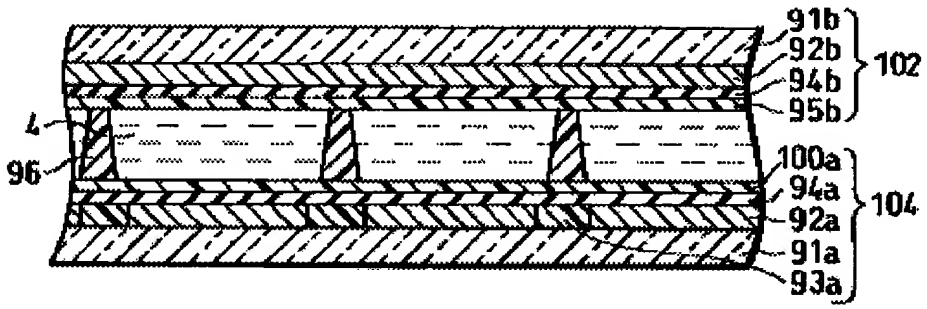
Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Shimada with the of long-chain alkyl group coated spacers of Utsumi to improve contrast and viewing angle.

Shimada does not explicitly disclose the step of binging said spacer into contact with a first or second orientation controlling membrane using van der Walls bonding or hydrogen bonding.

Shigeta teaches in Figure 29 the use of spacers such that, because the imidization ratio of the alignment layer 100a (Applicant's orientation controlling

membrane) baked at a temperature of 200.degree. C. is substantially 50 per cent, the hydroxy group and the hydrogen group remain in the compound, and the alignment layers 100a and 95b are bonded with each other via the spacer 96 by the hydrogen bonding. Also, since the spacer 96 is made of acrylic resin, and therefore is adhesive, the substrate 102 and the substrate 104 are strongly bonded with each other, thereby realizing a liquid crystal display element having a uniform cell thickness, high shock resistance, and a desirable displaying quality (col. 61, lines 51-61).

FIG. 29



Shigeta is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use alignment layers bonded to a spacer by hydrogen bonding to strongly bond with each other, thereby realizing a liquid crystal display element having a uniform cell thickness, high shock resistance, and a desirable displaying quality.

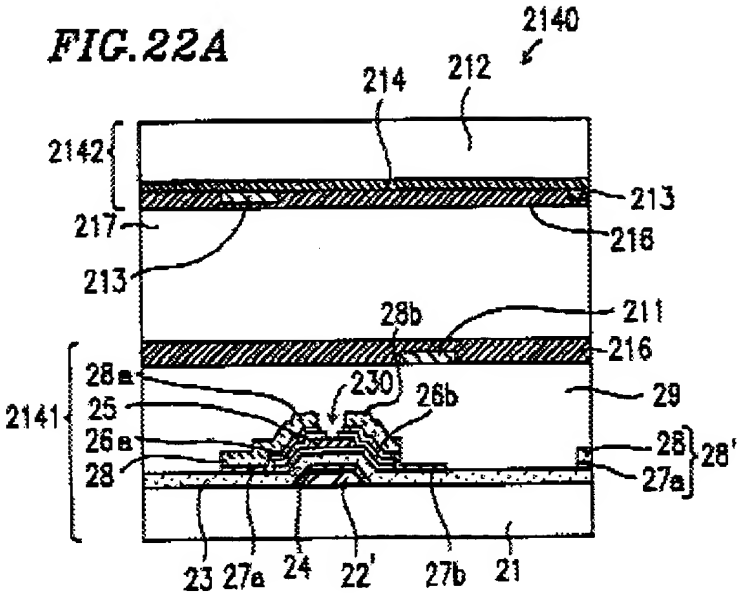
Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Shigeta with the

alignment layer bonded to a spacer by hydrogen bonding of Shigeta to strongly bond with each other, thereby realizing a liquid crystal display element having a uniform cell thickness, high shock resistance, and a desirable displaying quality.

5. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al (Shimada) USPAT 5,852,485 in view of Yih USPAT 3,866,313, Suzuki USPAT 6,509,948 B2, and Utsumi et al (Utsumi) USPAT 6,441,880 B1.

As to claims 15 and 16, the structural limitations in these process claims only have patentable weight when they have a non-obvious impact on the process steps, which in general, can be used to make any of a large number of LCD devices with alternate structures. Shimada discloses in Figures 21, 22A, and 22B, the process of fabricating a liquid-crystal display (LCD) device (in-plane switching-type or conventional type) which comprises; the fabrication of LCD substrate assemblies prior to filling with liquid crystal (Example 12, col. 31, line 66 through col. 36, line 6), comprising: a step of forming a first, substrate, 21, having plural electrodes that include a source line (Applicant's scanning signal line), 28', a Gate line (Applicant's image signal line), 22, a pixel electrode, 211, and an alignment layer, 216, all formed thereon, and a second substrate, 212, having a color filter, 214, a counter electrode also serving as a black matrix (Applicant's light-shielding film), 213, and an alignment layer, 216 all formed thereon.

FIG. 22A



Shimada does not explicitly disclose forming a sealant between the two substrates and around the outer peripheries of the substrates in such a manner that it partly reaches the edges of the substrates to form an opening through which liquid crystal is to be injected into the space between the sealed substrates, and a step of setting the panel in a liquid crystal-injecting unit having therein a container filled with liquid crystal, evacuating both the liquid crystal-injecting unit and the panel, putting the opening of the panel into the liquid crystal in the container, thereafter restoring the liquid crystal-injecting unit to have an atmospheric pressure in that condition so that the liquid crystal is injected into the panel through its opening owing to the inner pressure difference between the unit and the panel, and finally sealing the opening of the panel in such a condition that the panel receives no external pressure.

Yih teaches in Figures 1-6 the steps of adhesive application, evacuation, filling, sealing, etc. (Figures 1-5b, and col. 2, line 41 through col. 4 line 52) comprising forming a sealant between the two substrates (col. 3, lines 20-35) and around the outer

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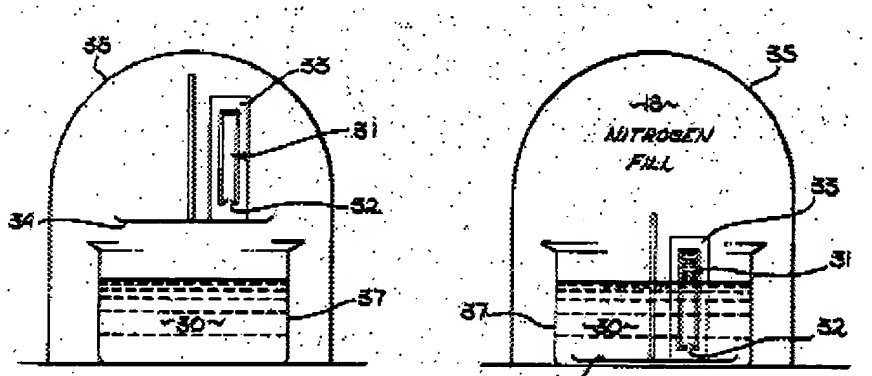

Fig. 5a Fig. 5b

Yih teaches forcing the liquid crystal into the LCD assembly by replacing the partial vacuum with a non-reacting gas (therefore at atmospheric pressure) (col. 6, lines 1-3). Yih teaches sealing after removal from the vacuum which would result in the panel receiving no external pressure (col. 4, lines 18 and 19), and Yih teaches sealing *after*

removal of the LCD device from the liquid crystal material after filling (col. 6, lines 14-21), and that could not be accomplished without introducing a bubble (avoided by the process of Yih) if the inner pressure were any lower than atmospheric pressure, especially by as much as 0.3 kgf/cm^2.

Yih is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use the adhesive application and fill techniques of Yih to complete LCD assembly with an internal pressure that is substantially equal to atmospheric pressure (within 0.3 Kgf/cm^2) to avoid bubble formation.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD fabrication process of Shimada with the sealing and filling process steps of Yih to avoid bubble formation.

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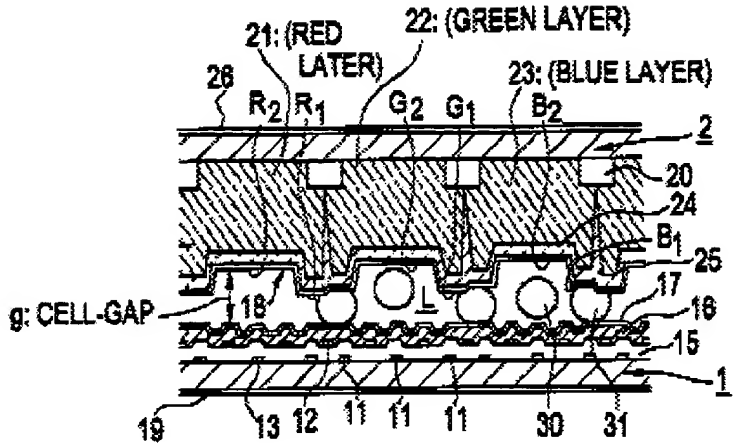
Suzuki teaches in Figures 2A and 2B defining a gap between the first and second substrate by disposing a spacer, 31, which is smaller than said gap, on a projecting pattern at a position corresponding to the shading membrane, 20, on one face of the second substrate where spacers, 30, remain uncompressed so the liquid crystal molecules will not be subject to anomalous orientation and light leakage will be avoided (Abstract).

FIG. 2B



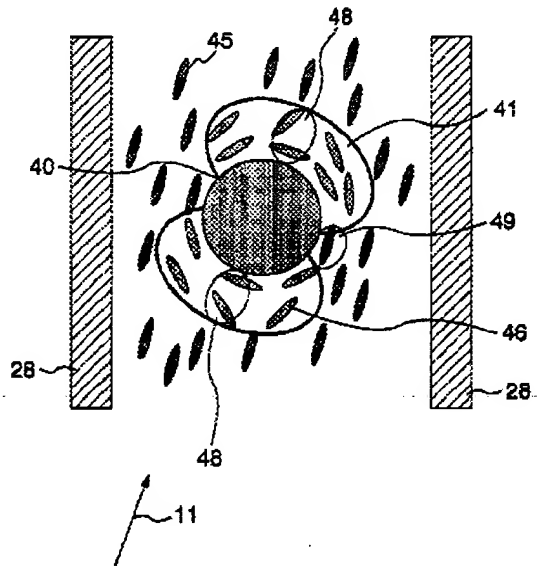
Suzuki is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to define a gap between the first and second substrate by disposing a spacer which is smaller than said gap, on a projecting pattern where spacers in the pixel regions remain uncompressed so the liquid crystal molecules will not be subject to anomalous orientation and light leakage will be avoided.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Shimada by defining a gap between the first and second substrate by disposing a spacer which is smaller than said gap, on a projecting pattern of Suzuki where spacers in the pixel regions remain uncompressed so the liquid crystal molecules will not be subject to anomalous orientation and light leakage will be avoided.

Shimada does not explicitly disclose a long-chain alkyl group (functional group) on the surface of the spacers and binging said spacer into contact with a first or second orientation controlling membrane using van der Walls bonding or hydrogen bonding.

Utsumi teaches in Figures 1, 2, and 9, the use of long-chain alkyl group coated spacers (col. 10, lines 8-11) to improve contrast and viewing angle (col. 5, lines 36-40, col. 9 and Abstract). Please note that adding the long-chain alkyl group (functional group) of Utsumi will result in spacers being brought into contact with a first or second orientation controlling membrane using van der Walls bonding or hydrogen bonding per Applicant's enabling disclosure. This is not improper hindsight; Applicant has disclosed that the result of using such spacers is all that is required to achieve such bonding.

FIG.2



Utsumi is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add the use of long-chain alkyl group coated spacers to improve contrast and viewing angle.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Shimada with the of long-chain alkyl group coated spacers of Utsumi (resulting in said spacers being brought into contact with a first or second orientation controlling membrane using van der Walls bonding or hydrogen bonding per Applicant's enabling disclosure) to improve contrast and viewing angle.

Response to Arguments

5. Applicant's arguments filed on 09 July 2004 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are as follows:

(1) Applied prior art does not teach bringing spacers into contact with only one substrate.

(2) Applied prior art does not teach binging a spacer into contact with one substrate via van der Walls bonding or hydrogen bonding.

(3) Applied prior art does not teach a projecting pattern at a position corresponding to a shading membrane on one face of the second substrate.

Examiner's responses to Applicant's ONLY arguments are as follows:

(1) It is respectfully pointed out that spacers smaller than the gap cannot contact more then one substrate in regions other than the projecting pattern.

(2) It is respectfully pointed out that addition of the long-chain alkyl group (functional group) of Utsumi will result in spacers being brought into contact with a first or second orientation controlling membrane using van der Walls bonding or hydrogen bonding per Applicant's enabling disclosure per rejections above. This is not improper hindsight; Applicant has disclosed that the result of using such spacers is all that is required to achieve such bonding.

(3) It is respectfully pointed out that Suzuki teaches a projecting pattern at a position corresponding to a shading membrane on one face of the second substrate per rejections above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (571) 272-2301. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Timothy L Rude
Examiner
Art Unit 2883

tlr

Frank G. Font
Supervisory Patent Examiner
Technology Center 2800